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DISCURSIVE CONTEXTS IN THE PHYSICS AND DIDACTIC MEDIATION CLASSROOMS: NEWTON LAWS AND EVERYDAY LIFE

Andrés Arturo Venegas Segura

Universidad Católica de Colombia

Bogotá – Colombia

<https://orcid.org/0000-0001-8065-5696>

Nelson Ricardo Fino Puerto

Universidad Católica de Colombia

Bogotá – Colombia

<https://orcid.org/0000-0003-4057-8758>

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Abstract: Communication presents the importance of having the discursive contexts of university students when didactic mediations are assumed, it must be noted that discourses on the subject of Newton's laws are a reflection of everyday fundamental in the development of scientific thinking and in the proposed didactic actions. The research was conducted with the participation of engineering students in the subject of mechanical physics of the Catholic University in the city of Bogotá, Colombia, having as reference the laws of Newton.

In the first place, for the analysis of the discourse methodologically the concept of value of Ricoeur (2006) is assumed, so that language expresses meaning and allows interpretation in culture. This process allows to locate their discursive contexts, their motivations and interests, with which a didactic medication is proposed and implemented for the learning of Newton's laws.

It must be noted that the concern of the didactic actions is in the understanding of the theme, the expansion of its discursive universe, that of not violating its ways of thinking, with this position and the exposed methodological process the teaching-learning process is potentiated And the epistemic contexts present in the science class are valued, which is the conclusion of communication. So that the conflicts given in class development are revalued around coherence, the self-assessment process, autonomous and collaborative work, the relationship between peers, elements that are ratified in a position more in line with the reality of the students.

Keywords: Didactic mediation, discourse analysis, Newton's laws, university education

INTRODUCTION

At present, various works worldwide, a teaching more in line with the contexts of the students is thought, the above allows the didactic medications that the teacher to be adequate. In this sense, the students' speeches, their experiences, their motivations, their desires, facilitate classroom proposals and the learning process.

In a way, that the teaching of physics with a perspective focused on the cultural and discursive contexts of students enable a better way the development of scientific, critical thinking, quantitative and qualitative reasoning, the improvement of argumentative and discursive skills in The classroom of Sciences. This position requires a based, constant work, designed from the teacher for the various actors of the school scenario. (Molina, Melo, 2014; Ruiz, Tamayo, 2013; Tebar, 2009).

So that it contributes to the dialogue of knowledge and the importance of the development of scientific thinking at the university level, so that the work presented is defined in this field of thought, which takes as a work axis the subject of mechanics at the Catholic University, especially the theme of Newton's laws that are central to their learning.

METHODOLOGY AND DIDACTIC ELEMENTS

With reference to the development of work, it is important to take into account the ideas, scientific concepts, and various dialogic elements presented by engineering students with science, everyday life, among others. In terms of Ruiz, Tamayo, Márquez [3, p. 32], it is required to "promote relevant learning environments for the development of argumentation in science, demands (...), at least three aspects: epistemological, didactic and conceptual."

Methodologically the existence of selection

processes about the corpus of knowledge that people use about their world and the decisions they make about them are present in the expressions used, which also imply significance processes (Elkana, 1983; Cobern 1996; Ricoeur, 2006).

Thus, the meaning, the explanations and statements on a particular theme are directly determined by culture (Elkana, 1983. In this scenario, in this scenario, in this scenario, to carry out a didactic mediation the recognition of their ideas is made, with this proposes a class activity that potentiates its discursive universes.

DIDACTIC RESULTS AND ELEMENTS PROPOSED IN THE CLASSROOM

The sequence that was carried out fulfilled the following criteria and parameters, which allows to propose a didactic mediation:

At first the following task is proposed, writing a story or an essay that involves Newton's laws. In this sense, it is sought that the student generates relationships between the theory of natural sciences and their daily practices link-practical linking, find a niche point for their arguments and find in epistemic diversity a meeting point to develop work in class.

In the students' writings, the argument is marked by social situations, high recognition athletes, imaginary referring to comics and superheroes, statements without a particular subject, theoretical and numerical data, among others.

The following situations are highlighted on a bicycle, Juan Montando skateboard, Tiger Woods in a golf game, Radamel Falcao Garcia in a football game, a rock in a tree, the jump of a frog, a travel person from Bogotá Even the municipality of Melgar, these situations are experiences of the cultural context of students and are sources of cultural knowledge that

must be valued for class development. Let's review some:

The following fragment is important since the character acquires relevance, a child who performs a typical action of this age as a bicycle, the stage is very interesting since he describes the situation that he lives, and is about an interesting way to the Newton's first law:

"The child has already acquired a high speed because it is on a slope, when seeing a hole on the road it scares and brakes, this lighter frenon causes the bicycle to stop and the child continues to keep its speed before its bicycle stops This is determined as inertia" (A, 2018)

This explanation also presents emotions as "scares" in which the student is positioned in the place of the person, argues not only from the physical situation but from the context of its protagonist and the created scenario, which is a recreation of His cultural contexts.

Following the course of argumentation with reference to Newton's laws, static balance is present:

"Radamel Falcao García is sitting at the substitute bank of a soccer match, where the Monaco and PSG plays, he is in a state of rest or inertia" (B, 2018)

In addition, this condition is highlighted with the use of the word "compensation", which in itself implies a previous action and the search for a balance:

"The frog will remain at rest as long as I did not act on it an uncompromured force" (C, 2018),

So, the notion of force is present as fundamental and as a central element of the movement, thus, with Newton's second law it is important to mention that the generation of movement is present:

"We can say that when the child gets on his bicycle, he is in a state of rest, but when he wants to start his journey he must exert a force on the pedals so that this way he can move" (D, 2018)

The importance of interactions, which faculty some properties of kinematics such as the change in position and speed, which allows us to talk about acceleration, it must be noted that at this point its explanations is important in the anatomy of certain living beings: "Muscles exert a force that drives the frog up" (B, 2018)

With reference to Newton's third law, the interaction between two bodies is present in the action and the place where it is given, so that the pedaling of a child is found on a bicycle and the reaction at the time of movement.

"A child wants to ride a bicycle, when he climbs on her he starts his journey. To explain the Law of Action and Reaction in this sense we will tend into account or what occurs on the bicycle tires, when the accelerated movement starts the tires generate a reaction in the direction of the movement, (...)" (D, 2018)

In this order of ideas, in the description of Newton's third law, it is associated with the intervention of two elements, people, animals, and/or among them, this is the case of a student's speech about a golf party of Tiger Woods where through the intervention of a bird this loses the game of the final.

"... When a small little bird appears out of nowhere, it carried the same speed as the ball, and generated a collision that moves the ball to one side and the bird towards the other expressing perfectly the 3rd law. And thus losing Tiger Woods its end of the London Champions Golf" (E, 2018)

However, after generating these initial description processes and discourse analysis and observing the richness of the explanations given in their writings, which was supported by hours of independent work and in virtual and face-to-face tutorials, the next phase of work to Continuing was reading the writing in the group.

The reading of the proposal of the writing in the group, in this sense the student before

the group reads his writing and in addition to this some begin to integrate into their speeches the foundation of mathematical thinking for their situation, with the above its discursive universe is expanded with the concepts provided by the science and teaching of it. Which is observed in the figure (1).

At this point a didactic is assumed that recognizes the voice of the other, based on dialogue, on the recognition of the other's thinking, and on the assessment of his work. In addition, teamwork and as a student construction engine, their peers and their teacher are visualized.

As this process is observed, it is an interlocution process with the teacher and their classmates who contribute from their positions and thus develop teamwork. This way the student launches his ideas, allows an appropriation, and the assimilation of a series of broader knowledge to those worked in class (Ricoeur, 2006; Erduran, Jimenez, 2008)

At this point a reflection on the writing, its structure and laws of Newton is generated. This point is central since in permanent dialogue about the given work, elements are developed that potentiate learning, in a broad sense, to know, to make, to live together, among others.

After this aspect, a reformulation and expansion of the brief by the students is generated. In this order of ideas there has been a process that strongly links the teacher-study relationship, in which, it is allowed to visualize how the learning process is permanent, in which the different school actors acquire a predominant role.

Next step in mediation takes up the reflexive aspects in a collective context. Where it is allowed to reaffirm the previous points and generate a more inclusive educational process.

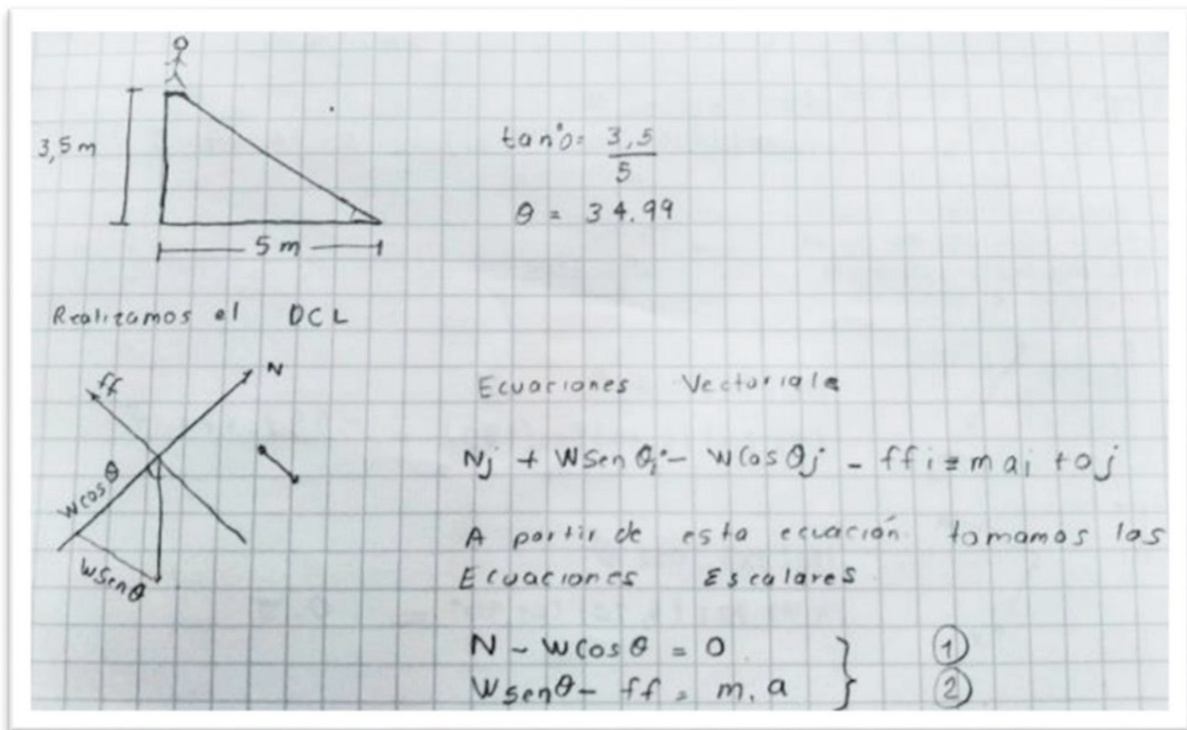


Fig. 1. Graphic representation and solution scheme (G, 2018).

CONCLUSION

As a conclusion, a reflection on the work carried out is carried out, where it is highlighted that change in the teaching of the sciences must be made to carry out a process: closer to the student, that assesses the epistemic and cultural diversity of the students; It passes from a more expository method to one based on the joint construction that is mediated by the inquiry, construction, interpretation and permanent reflection; The training of scientific and critical thinking based on the reality of each person and their life experiences is attended; The teacher's work is based on his social role, as a mediator.

The teaching environments designed by the teacher are closer to the diversity of student learning realities, where the other is recognized in their diversity.

It is also found that the interpretations made are mediated by their sources of knowledge (Elkana, 1983), and his worldview (Cobern 1996). So that the sources of knowledge allow to propose the elements that mediate the didactic aspects for the understanding of scientific concepts (Molina, Melo, 2014; Rodríguez, Molina 2014), where it seeks to expand their discursive and argumentative universes (Venegas, 2020).

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- Biografía. Autor 1: Andrés Arturo Venegas Segura.
- Doctor en Educación. Formación de Maestría en Docencia. Especialista en Bioingeniería. Licenciado en Física. Docente Universidad Católica de Colombia y Universidad Distrital. Coordinador Tutorías Virtuales Departamento de Ciencias Universidad Católica de Colombia.
- Áreas de investigación: Enseñanza de las ciencias y las matemáticas, Biofísica, Infancia e Inclusión.
- Biografía. Autor 2: Nelson Ricardo Fino Puerto
- Magister en Física Universidad de los Andes. Licenciado en Física. Ingeniero de Sistemas. Docente Universidad Católica de Colombia y Universidad de la Salle.
- Áreas de investigación: Enseñanza de las ciencias y las matemáticas.